

AMENDMENTS TO THE CLAIMS

Claim 1 (withdrawn): method for simultaneously conducting a plurality of micro-volume molecular haplotyping reactions, the method comprising:

(a) introducing a plurality of liquid samples into the sample chambers of a microhole apparatus, wherein the samples contain necessary molecular haplotyping reaction components; and

(b) placing the apparatus into an environment favorable to the molecular haplotyping reaction;

wherein the microhole apparatus comprises a substrate, wherein the substrate defines a plurality of sample chambers, wherein each sample chamber:

(i) extends through the substrate;

(ii) comprises one or more walls and an opening at each end; and

(iii) holds a sample such that the sample is retained in the apparatus through surface tension and such that a liquid sample present in one sample chamber does not intermix with a liquid sample present in another sample chamber; and

wherein the apparatus is substantially free of contaminating amplifiable polynucleotides.

Claims 2-9 (Cancelled)

Claim 10 (withdrawn): An apparatus for containing multiple micro-volume liquid samples comprising a substrate, wherein the substrate defines a plurality of sample chambers, wherein each sample chamber:

(a) extends through the substrate,

(b) comprises one or more walls and an opening at each end, and

(c) holds a sample such that the sample is retained in the apparatus through surface tension and such that a liquid sample present in one sample chamber does not intermix with a liquid sample present in another sample chamber;

wherein the apparatus is substantially free of contaminating amplifiable polynucleotides; and

wherein the apparatus comprises at least one reagent used in a molecular haplotyping reaction to be carried out in the apparatus.

Claim 11 (withdrawn): An apparatus according to claim 10 wherein the apparatus comprises at least two reagents used in a molecular haplotyping reaction to be carried out in the apparatus.

Claim 12 (withdrawn): An apparatus according to claim 10 wherein the sample chamber has a height to width ratio of about 1:1, wherein the height of the sample chamber is measured from one face of the substrate to the other.

Claim 13 (withdrawn): An apparatus according to claim 10 wherein the substrate comprises hydrophobic regions, wherein the hydrophobic regions are located on the substrate such that a liquid sample present in one sample chamber does not intermix with a liquid sample present in another sample chamber.

Claim 14 (withdrawn): An apparatus according to claim 10, wherein the substrate comprises an upper face and a lower face.

Claim 15 (withdrawn): An apparatus according to claim 14, wherein the through axes of the sample chambers are perpendicular to both faces of the substrate.

Claim 16 (withdrawn): An apparatus according to claim 15, wherein the sample chamber has the shape of a right circular cylinder.

Claim 17 (withdrawn): An apparatus according to claim 15, wherein the sample chamber has the shape of a right polygonal prism.

Claim 18 (withdrawn): An apparatus according to claim 13, wherein the hydrophobic regions are located on the upper and lower faces of the substrate such that the openings of at least one sample chamber from at least one adjacent sample chamber by a hydrophobic region.

Claim 19 (withdrawn): An apparatus according to claim 18, wherein additional hydrophobic regions are located on the walls of the sample chambers.

Claims 20-23 (Canceled)

Claim 24 (withdrawn): A kit comprising an apparatus for containing multiple micro-volume liquid samples for performing a molecular haplotyping reaction, comprising a substrate, wherein the substrate defines a plurality of sample chambers, wherein each sample chamber:

- (a) extends through the substrate,
- (b) comprises one or more walls and an opening at each end, and
- (c) holds a sample such that the sample is retained in the apparatus through surface tension and such that a liquid sample present in one sample chamber does not intermix with a liquid sample present in another sample chamber;

wherein the apparatus is substantially free of contaminating amplifiable polynucleotides;

and further comprising a molecular haplotyping reaction component packaged in a suitable container.

Claim 25 (withdrawn): A kit according to claim 24, wherein the molecular haplotyping reaction component is affixed to the substrate.

Claim 26 (withdrawn): A kit according to claim 24, wherein the kit further comprises a hydrophobic substance to be used with the apparatus.

Claim 27 (withdrawn): A kit according to claim 26, wherein the hydrophobic substance is a hydrophobic fluid packaged in a suitable container.

Claim 28 (withdrawn): A kit according to claim 26, wherein the hydrophobic substance is a hydrophobic cover.

Claim 29 (withdrawn): A kit according to claim 24, further comprising a chamber for maintaining the appropriate environmental conditions for a molecular haplotyping reaction to be carried out in the apparatus.

Claim 30 (withdrawn): A kit according to claim 24, further comprising a device for loading samples into the sample chambers.

Claim 31 (Currently amended): An apparatus for containing multiple micro-volume liquid samples comprising a substrate, wherein the substrate defines a plurality of sample chambers, wherein each sample chamber:

(a) extends through the substrate;

(b) has a height to width ratio of less than or equal to 2:1 when the height of the sample chamber is measured from one face of the substrate to the other;

(c) comprises one or more walls and an opening at each end; and

(d) ~~(e)~~ holds a sample such that the sample is in the form of a thin film such that a liquid sample present in one sample chamber does not intermix with a liquid sample present in another sample chamber; ~~and~~ wherein the substrate comprises titanium.

Claim 32 (Currently amended): An apparatus according to claim 31, wherein the sample chamber has a height to width ratio of less than or equal to 1:1, ~~wherein the height of the sample chamber is measured from one face of the substrate to the other.~~

Claim 33 (Original): An apparatus according to claim 31 wherein the substrate comprises hydrophobic regions, wherein the hydrophobic regions are located on the substrate such that a liquid sample present in one sample chamber does not intermix with a liquid sample present in another sample chamber.

Claim 34 (Original): An apparatus according to claim 33, wherein the substrate comprises an upper face and a lower face.

Claim 35 (Original): An apparatus according to claim 34, wherein the through axes of the sample chambers are perpendicular to both faces of the substrate.

Claim 36 (Original): An apparatus according to claim 35, wherein the sample chamber has the shape of a right circular cylinder.

Claim 37 (Original): An apparatus according to claim 35, wherein the sample chamber has the shape of a right polygonal prism.

Claim 38 (Original): An apparatus according to claim 33, wherein the hydrophobic regions are located on the upper and lower faces of the substrate such that the openings of at least one sample chamber from at least one adjacent sample chamber by a hydrophobic region.

Claim 39 (Original): An apparatus according to claim 38, wherein additional hydrophobic regions are located on the walls of the sample chambers.

Claim 40 (Original): An apparatus according to claim 33, wherein hydrophobic regions are located on the walls of the sample chambers.

Claim 41 (Original): An apparatus according to claim 40, wherein the hydrophobic region forms an annular ring along the wall of the sample chamber.

Claim 42 (Original): An apparatus according to claim 40, comprising two or more hydrophobic regions, each forming an annular ring along the wall of the sample chamber, wherein the hydrophobic regions define one or more annular non-hydrophobic rings therebetween.

Claim 43 (Original): An apparatus according to claim 31 further comprising at least one component of a reaction to be carried out in the apparatus.

Claim 44 (Original): An apparatus according to claim 31 wherein a reaction component is affixed to the substrate.

Claim 45 (Currently amended): An apparatus according to claim ~~43~~ 31, wherein the component is a reagent used in a nucleotide sequencing reaction, a hybridization reaction, or a polynucleotide amplification reaction.

Claim 46 (Original): An apparatus according to claim 31, wherein the apparatus is substantially free from contaminating amplifiable polynucleotides.

Claim 47 (Currently amended): A kit comprising an apparatus for containing multiple micro-volume liquid samples comprising a substrate, wherein the substrate defines a plurality of sample chambers, wherein each sample chamber:

- (a) extends through the substrate; ;
- (b) has a height to width ratio less than or equal to 2:1 when the height of the sample chamber is measured from one face of the substrate to the other;
- (c) comprises one or more walls and an opening at each end; ; and
- (d) ~~(e)~~ holds a sample such that the sample is in the form of a thin film such that a liquid sample present in one sample chamber does not intermix with a liquid sample present in another sample chamber; and wherein the substrate comprises titanium, wherein the kit further comprises at least one component of a reaction to be carried out in the apparatus.

Claim 48 (Currently amended): The kit according to claim 47, wherein the sample chamber has a height to width ratio of less than 1:1, ~~wherein the height of the sample chamber is measured from one face of the substrate to the other; and further comprising a reaction component packaged in a suitable container.~~

Claim 49 (Currently amended): The kit according to claim ~~48~~ 47, wherein the reaction component is a reagent for performing a reaction selected from the group consisting of ligation reactions, primer extension reactions, nucleotide sequencing reactions, restriction endonuclease digestions, oligonucleotide synthesis, hybridization reactions and biological interactions.

Claim 50 (Original): A kit according to claim 47, further comprising a hydrophobic substance to be used with the apparatus.

Claim 51 (Original): A kit according to claim 50, wherein the hydrophobic substance is a hydrophobic fluid packaged in a suitable container.

Claim 52 (Original): A kit according to claim 50, wherein the hydrophobic substance is a hydrophobic cover.

Claim 53 (Original): A kit according to claim 47, further comprising a chamber for maintaining the appropriate environmental conditions for a reaction to be carried out in the apparatus.

Claim 54 (Original): A kit according to claim 47, further comprising an apparatus for loading samples into the sample chambers.

Claim 55 (New): An apparatus according to claim 31, wherein the substrate comprises top and bottom surfaces that each contain raised features which form closed curves circumscribing the openings to said sample chambers.

Claim 56 (New): An apparatus according to claim 31, wherein the chambers comprise a hydrophobic annular ring on the wall of the chamber, separating two hydrophilic regions.

Claim 57 (New): An apparatus according to claim 45, wherein the apparatus comprises template, reagent and primer pairs for a polynucleotide amplification reaction.

Claim 58 (New): An apparatus according to claim 57, wherein the template is DNA.

Claim 59 (New): An apparatus for containing multiple micro-volume liquid samples comprising a substrate, wherein the substrate defines a plurality of sample chambers, wherein each sample chamber:

- (a) extends through the substrate;
- (b) comprises one or more walls and an opening at each end; and
- (c) holds a sample such that the sample is in the form of a thin film such that a liquid sample present in one sample chamber does not intermix with a liquid sample present in another sample chamber; and further comprising reagents sufficient to carry out a nucleotide sequencing reaction, a hybridization reaction, or a polynucleotide amplification reaction.

Claim 60 (New): An apparatus of claim 59 wherein the substrate comprises titanium.

Claim 61 (New): An apparatus of claim 59 wherein the sample chambers have a height to width ratio of less than or equal to 2:1 when the height of the sample chamber is measured from one face of the substrate to the other.

Claim 62 (New): An apparatus of claim 61 wherein the substrate comprises titanium.

Claim 63 (New): An apparatus according to claim 59, wherein the chambers comprise a hydrophobic annular ring on the wall of the chamber, separating two hydrophilic regions.

Claim 64 (New): A kit according to claim 47 wherein the component is a reagent used in a nucleotide sequencing reaction, a hybridization reaction, or a polynucleotide amplification reaction.

Claim 65 (New): A kit according to claim 64 wherein the component is a reagent used in a polynucleotide amplification reaction.

Claim 66 (New): A kit according to claim 64 comprising a hydrophobic cover.